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Sampling Episode Report Princess Cruise Lines Island Princess Sampling Episode 6505

Chapter 3 Sample Collection Methodology

March 2006

3.0 SAMPLE COLLECTION METHODOLOGY

This section describes the sample collection and analysis methods and deviations from the ship-specific Sampling and Analysis Plan for Island Princess (Island SAP; Appendix E). A more detailed explanation of the sampling methodologies, analytes and analytical methods, sampling frequency and duration, schedule, and logistics that were followed during the sampling onboard the Island can be found in Section 3.0 of the Island SAP.

3.1 Pre-Sampling Activities

EPA performed an engineering ship visit to the Island on March 25, 2004. The Island SAP was prepared based on information collected during that ship visit and from subsequent follow-up communication with Princess personnel. One week prior to the sampling episode, personnel conducted sampling setup activities onboard the Island, including loading sampling equipment and the onboard laboratory, inspecting the installed sampling ports, installing the strap-on ultrasonic flow meters, and installing and programming the automatic sampling machines.

3.2 Sample Collection and Analysis Methodology

In general, samples of laundry, galley, and accommodations wastewater and influent to and effluent from the treatment system were taken for five consecutive 24-hour periods, while wastewater treatment residual samples were taken for one 24-hour period (see Tables 2-1 and 2-2). System piping precluded collection of samples of food pulper wastewater as generated.

Laundry, galley, and food pulper wastewaters are stored in holding tanks for 2 to 5 days before being discharged untreated outside of 12nm from shore. One-time grab samples of these wastewaters were collected, primarily to determine their pathogen indicators counts. Because the onboard pathogen indicators laboratory was not yet operating at the time of sample

collection, pathogen indicator analyses for these samples were performed approximately 18 hours outside the required 6-hour holding time; the resulting data are not considered valid. However, other analytes were also analyzed for; results are presented in Appendix A-2.

Various sample collection methods (described in Table 3-1) were used depending on the waste stream and analyte (see Table 3-2). Most samples were composited over each 24-hour sampling period or were single grab samples in a 24-hour period. However, multiple (1 to 3) grab samples per 24-hour period were collected for pathogen indicator analyses because these samples must be analyzed within 6 hours of collection (see Table 3-2). Table 3-3 describes the analyte groups and lists the analytical methods used.

Each time a grab or grab composite sample was taken, another separate sample was placed in a separate container to perform field measurements of pH, temperature, conductivity, salinity, turbidity, sulfide, and free and total chlorine onboard. Temperature and pH were measured immediately at the sampling point, and the remaining parameters were measured at the sample staging area onboard. See Table 3-4 for equipment used for these measurements. Field measurements are used primarily to determine sample preservation requirements. Samples (other than those used for field measurements) were preserved in accordance with procedures described in the Island SAP (Appendix E), with exceptions as noted in Section 3.6 and Table 3-5. Note that while Alaska and Federal regulations for cruise ship discharges include standards for total residual chlorine, the equipment used to measure residual chlorine onboard was not suitable for measuring low levels of chlorine (detection limit of 20 $\mu\text{g/L}$ compared to a standard of 10 $\mu\text{g/L}$) and was subject to various interferences, such as from oxidized forms of manganese. Accordingly, the field measurements collected during this sampling episode should not be used to assess compliance with cruise ship discharge standards.

Flow data were collected from the strap-on flow meters installed by the sampling team. See Section 2.4 for descriptions of the flow meter locations and Figures 2-1 and 2-2 for their locations. The flow meters were programmed to record the instantaneous flow rate (m^3/min) and total flow (m^3) every five minutes.

3.3 Converting Solids Mass Units to Volume Units

The screening solids samples had high solids contents; therefore, the results for classical pollutants, metals, and volatile and semivolatile organics were reported by the laboratories in mass units. To allow for direct comparison of these results to those of other wastewater samples, mass units for this sample were converted to volume units using the following equation and assuming a sample density of 1:

$$\text{Amount (mass units)} * (\% \text{ solids}/100) = \text{Amount (volume units)}$$

All data in this report pertaining to the screening solids sample are reported in volume units. The laboratory data packages, which are included in the Cruise Ship Rulemaking Record and available upon request, contain the original mass units results reported by the laboratories. Note that the analytical results for the incinerator ash sample were also reported in mass units. However, the incinerator ash results were not converted because the sample was >90% solids.

3.4 Quality Assurance/Quality Control

Duplicate samples were collected for quality assurance and quality control. Results for duplicate samples were averaged. See Section 5.2.3 and Tables 5-3 and 5-4 for details on duplicate sampling. Other field quality control samples prepared for this sampling episode include a trip blank and an equipment blanks, which are discussed in Sections 5.2.1 and 5.2.2, respectively.

3.5 Interview with the Ship's Crew

The ship's crew was interviewed to obtain information regarding activities that impact wastewater generation. See Appendix C for details on these interviews and Section 4.2 for a summary.

3.6 Deviations from the Sampling and Analysis Plan

The sampling episode proceeded as specified in the Island SAP with the deviations described in Table 3-5.

Table 3-1

Sample Collection Method Descriptions, Island Princess

Sample Collection Method	Description
Composite by Flow	Flow-weighted composite samples were collected using an automatic sampling machine interfaced with an installed strap-on ultrasonic flow meter (see Section 2.4). The flow meter signaled the automatic sampling machine to collect a 250-mL sample aliquot each time a fixed quantity of wastewater passed through the wastewater pipe. The number of composite sample aliquots collected per 24-hour sampling period ranged from approximately 30 to 60, depending on the total volume of sample required for the planned analyses each sampling day. Sample aliquots were collected into a 10-L sample composite jar stored within the sampling machine. At the end of each 24-hour period, the sample composite jar(s) were mixed and poured into individual sample bottles for analysis. Samples collected using the composite-by-flow method best represent a waste stream flowing through a pipe.
Composite by Time	Time-weighted composite samples were collected using an automatic sampling machine programmed to collect 250-mL sample aliquots at fixed time intervals. The programmed time interval differed by sampling point (see Table 3-2). The number of composite sample aliquots collected per 24-hour sampling period ranged from approximately 30 to 40, depending on the total volume of sample required for planned analyses. Sample aliquots were collected into a 10-L composite jar stored within the sampling machine. At the end of the 24-hour sampling period, the sample composite jar(s) were mixed and poured into individual sample bottles for analysis. The composite-by-time method was used when composite-by-flow method was not feasible.
Grab	Grab samples were discrete samples collected directly into the sample bottles from the sample tap or through Teflon® tubing connected to the sample tap. Note that samples for pathogen indicator analyses were collected as grab samples (as opposed to composite sample) because they must be analyzed within a 6-hour holding time.
Grab composite	<p>Samples (1 to 4 per 24-hour sampling period) were manually collected as grab samples but composited either in the field or at the laboratory for a single analysis. The grab composite method was used when composite-by-flow or composite-by-time methods were not appropriate.</p> <p>Volatile organics – grab samples were collected directly into sample vials, which were filled completely to avoid loss of target analytes by volatilization. Grab samples for each 24-hour period for analysis of volatile organics were composited by the laboratory for a single analysis.</p> <p>Total and available cyanide – grab samples were chemically preserved as soon as possible to minimize sample interferences. The preserved total and available cyanide grab samples for each 24-hour period were composited onboard by the sampling team for a single analysis.</p> <p>Hexane-extractable material/silica-gel treated hexane-extractable material (HEM/SGT-HEM)– grab samples were collected directly into sample containers to avoid loss of HEM/SGT-HEM that might adhere to the interior of any interim sampling container (e.g., sample composite jar). The sampling team prepared composite HEM/SGT-HEM samples onboard for a single analysis per sampling point per day by filling approximately one-fourth (250-mL) of the sample containers when they collected each grab sample, resulting in 1-liter of sample in each container at the end of each sampling period.</p>

Table 3-2

Sample Collection Method and Analyte Groups Tested by Sampling Point, Island Princess

Wastewater Name	Sampling Point #(a) (b)	Sample Collection Method (c)	Analyte Groups Tested (d)	# of Days Sampled
Galley	SP-1	Composite by flow Twenty-four-hour sampling periods began at 0600 each day.	Classical pollutants: -BOD ₅ -Settleable residue -Group I -Group II Total and dissolved metals Semivolatile organics Pesticides	5
		Grab composite The collection times of the four subsamples in the composites each day can be found in Appendix A-3	Classical pollutants: -HEM/SGT-HEM -Total and available cyanide Volatile organics	
		Grab Two grab samples were taken per sampling day. Results are presented in Table 4-1 are an average for each sampling day. Results and collection times for each grab sample are presented in Appendix A-1.	Pathogen indicators	

- (a) See Figures 2-1 and 2-2 for simplified diagrams of the Island graywater and sewage CHT and treatment systems indicating the sampling points and flow meter locations.
 (b) Two sampling point numbers indicate duplicate samples taken at this point for certain analytes. See Section 5.2.3 and Tables 5-3 and 5-4 for details on duplicate sampling.
 (c) See Table 3-1 for descriptions of sample collection methods.
 (d) See Table 3-3 for additional information regarding analytes tested and analytical methods used.

Table 3-2 (Continued)

Wastewater Name	Sampling Point #(a) (b)	Sample Collection Method (c)	Analyte Groups Tested (d)	# of Days Sampled
Laundry	SP-2	Composite by time Automatic sampling machine was programmed to collect 250-mL sample aliquots at three-minute time intervals. The sampling machine successfully collected sample aliquots only during the relatively few intervals during the 24-hour sampling periods (sampling periods began at 0600 each day) when the laundry wastewater holding tank discharge pump turned on, thereby more closely approximating a flow-weighted composite sample.	Classical pollutants: -BOD ₅ -Settleable residue -Group I -Group II Total and dissolved metals Semivolatile organics Dioxins and furans	5
		Grab Composite The number of subsamples in the composites taken per sampling day were as follows: 1, 3, 4, 4, 4. The collection times of the subsamples of the composites can be found in Appendix A-3.	Classical pollutants: -HEM/SGT-HEM -Total and available cyanide Volatile organics	
		Grab The number of grab samples taken per day were as follows: 1, 2, 2, 2, 2. Results presented in Table 4-2 are an average for each sampling day (calculation used detection limits for nondetected results). Results and collection times for each grab sample are presented in Appendix A-1.	Pathogen indicators	
Accommodations	SP-3	Composite by flow Twenty-four-hour sampling periods began at 0600 each day.	Classical pollutants: -BOD ₅ -Settleable residue -Group I -Group II Total and dissolved metals Semivolatile organics	5
		Grab composite The collection times of the four subsamples in the composites can be found in Appendix A-3.	Classical pollutants: -HEM/SGT-HEM -Total and available cyanide Volatile organics	5
		Grab Two grab samples were taken per sampling day. Results presented in Table 4-3 are an average for each sampling day (calculation used detection limits for nondetected results). Results and collection times for each grab sample are presented in Appendix A-1.	Pathogen indicators	

- (a) See Figures 2-1 and 2-2 for simplified diagrams of the Island graywater and sewage CHT and treatment systems indicating the sampling points and flow meter locations.
- (b) Two sampling point numbers indicate duplicate samples taken at this point for certain analytes. See Section 5.2.3 and Tables 5-3 and 5-4 for details on duplicate sampling.
- (c) See Table 3-1 for descriptions of sample collection methods.
- (d) See Table 3-3 for additional information regarding analytes tested and analytical methods used.

Table 3-2 (Continued)

Wastewater Name	Sampling Point #(a) (b)	Sample Collection Method (c)	Analyte Groups Tested (d)	# of Days Sampled
Influent to Hamworthy Treatment System	SP-4	Composite by flow Twenty-four-hour sampling periods began at 0600 each day.	Classical pollutants: -BOD ₅ -Settleable residue -Group I -Group II Total and dissolved metals Semivolatile organics Pesticides Polychlorinated biphenyls	5
		Grab composite The collection times of the four subsamples in the composites each day can be found in Appendix A-3.	Classical pollutants: -HEM/SGT-HEM -Total and available cyanide Volatile organics	
		Grab Three grab samples were taken per sampling day. Results presented in Table 4-6 are an average for each sampling day. Results and collection times for each grab sample are presented in Appendix A-1.	Pathogen indicators	
Influent to UV Disinfection Part of Hamworthy Treatment System	SP-5	Grab Three grab samples were taken per sampling day. Results are presented in Table 4-7 are an average for each sampling day (calculation used detection limits for nondetected results). Results and collection times for each grab sample are presented in Appendix A-1.	Pathogen indicators	5
Effluent from Hamworthy Treatment System	SP-6/7	Composite by flow Twenty-four-hour sampling periods began at 0600 each day.	Classical pollutants: -BOD ₅ -Settleable residue -Group I -Group II Total and dissolved metals Semivolatile organics	5
		Grab composite The collection times of the four subsamples in the composites each day can be found in Appendix A-3.	Classical pollutants: -HEM/SGT-HEM -Total and available cyanide Volatile organics	
		Grab	Pathogen indicators	

(a) See Figures 2-1 and 2-2 for simplified diagrams of the Island graywater and sewage CHT and treatment systems indicating the sampling points and flow meter locations.

(b) Two sampling point numbers indicate duplicate samples taken at this point for certain analytes. See Section 5.2.3 and Tables 5-3 and 5-4 for details on duplicate sampling.

(c) See Table 3-1 for descriptions of sample collection methods.

(d) See Table 3-3 for additional information regarding analytes tested and analytical methods used.

Table 3-2 (Continued)

Wastewater Name	Sampling Point #(a) (b)	Sample Collection Method (c)	Analyte Groups Tested (d)	# of Days Sampled
Galley Overboard Discharge	SP-8	Grab One grab sample was taken. Appendix A-3 shows the collection time.	Pathogen indicators Classical pollutants: -BOD ₅ -Settleable residue -Group I -Group II -HEM/SGT-HEM -Total and available cyanide Total and dissolved metals Volatile and semivolatile organics	1 (August 26, 2005, prior to sampling episode; see Table 3-5)
Laundry Overboard Discharge	SP-9	Grab One grab sample was taken. Appendix A-3 shows the collection time.	Pathogen indicators Classical pollutants: -BOD ₅ -Settleable residue -Group I -Group II -HEM/SGT-HEM -Total and available cyanide Total and dissolved metals Volatile and semivolatile organics	1 (August 26, 2005, prior to sampling episode; see Table 3-5)
Food Pulper Overboard Discharge	SP-10	Grab One grab sample was taken. Appendix A-3 shows the collection time.	Pathogen indicators Classical pollutants: -BOD ₅ -Settleable residue -Group I -Group II -HEM/SGT-HEM -Total and available cyanide Total and dissolved metals Volatile and semivolatile organics	1 (August 26, 2005, prior to sampling episode; see Table 3-5)

(a) See Figures 2-1 and 2-2 for simplified diagrams of the Island graywater and sewage CHT and treatment systems indicating the sampling points and flow meter locations.

(b) Two sampling point numbers indicate duplicate samples taken at this point for certain analytes. See Section 5.2.3 and Tables 5-3 and 5-4 for details on duplicate sampling.

(c) See Table 3-1 for descriptions of sample collection methods.

(d) See Table 3-3 for additional information regarding analytes tested and analytical methods used.

Table 3-2 (Continued)

Wastewater Name	Sampling Point #(a) (b)	Sample Collection Method (c)	Analyte Groups Tested (d)	# of Days Sampled
Screening Solids	SP-11	Grab One grab sample was taken. Appendix A-3 shows the collection time.	Classical pollutants: -Group I -Group II -Total and available cyanide Total metals Volatile and semivolatile organics	1 (Day 3)
Waste Biosludge	SP-12	Grab One grab sample was taken. Appendix A-3 shows the collection time.	Classical pollutants: -Group I -Group II -Total and available cyanide Total metals Volatile and semivolatile organics	1 (Day 1)
Incinerator Ash	SP-13	Grab One grab sample was taken. Appendix A-3 shows the collection time.	Total metals Semivolatile organics Dioxins and furans	1 (Day 3)
Source Water	SP-14	Grab One grab sample was taken. Appendix A-3 shows the collection time.	Pathogen indicators Classical pollutants: -BOD ₅ -Settleable residue -Group I -Group II -Total and available cyanide Total and dissolved metals Volatile and semivolatile organics	1 (Day 2)
Trip Blank	SP-15	Grab One grab sample was taken. Appendix A-3 shows the collection time. High performance liquid chromatography (HPLC) water was poured directly into sample vials in the contractor's Chantilly, VA sampling room and shipped to the Island. The trip blank was shipped back (unopened) to the laboratory along with the collected samples.	Volatile organics	1 (Day 5)

(a) See Figures 2-1 and 2-2 for simplified diagrams of the Island graywater and sewage CHT and treatment systems indicating the sampling points and flow meter locations.

(b) Two sampling point numbers indicate duplicate samples taken at this point for certain analytes. See Section 5.2.3 and Tables 5-3 and 5-4 for details on duplicate sampling.

(c) See Table 3-1 for descriptions of sample collection methods.

(d) See Table 3-3 for additional information regarding analytes tested and analytical methods used.

Table 3-2 (Continued)

Wastewater Name	Sampling Point #(a) (b)	Sample Collection Method (c)	Analyte Groups Tested (d)	# of Days Sampled
Equipment Blank	SP-16	Grab One grab sample was taken. The equipment blank consisted of HPLC water pumped through the automatic sampling machine and tubing and directly into sample bottles.	Total and dissolved metals Semivolatile organics	1 (Day 1)

- (a) See Figures 2-1 and 2-2 for simplified diagrams of the Island graywater and sewage CHT and treatment systems indicating the sampling points and flow meter locations.
- (b) Two sampling point numbers indicate duplicate samples taken at this point for certain analytes. See Section 5.2.3 and Tables 5-3 and 5-4 for details on duplicate sampling.
- (c) See Table 3-1 for descriptions of sample collection methods.
- (d) See Table 3-3 for additional information regarding analytes tested and analytical methods used.

Table 3-3

Analytes and Analytical Methods, Island Princess

Analyte Group	Analytes	Analytical Method Number
Pathogen Indicators	<i>E. coli</i>	EPA 9223B
	Enterococci	ASTM D6503-99
	Fecal coliform	EPA 9222D
Classical Pollutants	Biochemical oxygen demand (BOD ₅)	EPA 405.1
	Settleable residue (SS)	EPA 160.5
	Group I: -Total suspended solids (TSS) -Total dissolved solids (TDS) -Sulfate -Chloride -Alkalinity	EPA 160.2 EPA 160.1 EPA 375.4 EPA 325.3 EPA 310.1
	Group II: -Total organic carbon (TOC) -Chemical oxygen demand (COD) -Ammonia as nitrogen -Nitrate/nitrite as nitrogen -Total Kjeldahl nitrogen (TKN) -Total phosphorus	EPA 451.1, Lloyd Kahn ("solids" samples) HACH 8000 EPA 350.1 EPA 353.2, EPA 1685 ("solids" samples) EPA 351.3, EPA 1687 ("solids" samples) EPA 365.1
	Oil and grease measured as hexane extractable material and petroleum hydrocarbons measured as silica-gel treated hexane extractable material (HEM/SGT-HEM)	EPA 1664
	Cyanide -Total cyanide -Available cyanide	EPA 335.3 EPA 1677
	Hardness	SM 2340B
Total and Dissolved Metals	See Appendix A-2 for complete list of total and dissolved metals analyzed	EPA 200.7, EPA 200.8 (selenium and thallium), EPA 245.1 (mercury, "liquid" samples), EPA 245.5 (mercury, "solids" samples)
Volatile and Semivolatile Organics	See Appendix A-2 for a complete list of volatile and semivolatile organics analyzed.	EPA 624 EPA 625
Pesticides	See Appendix A-2 for a complete list of organohalide and organophosphorus pesticides analyzed.	EPA 1656A EPA 1657A
Polychlorinated Biphenyls (PCBs)	See Appendix A-2 for complete list of PCBs analyzed.	EPA 1668A
Dioxins and Furans	See Appendix A-2 for complete list of dioxins and furans analyzed.	EPA 1613B

Table 3-4

Field Measurement Equipment, Island Princess

Parameter	Measured by:
pH	Four-color pH paper
Temperature	Alcohol thermometer
Conductivity and salinity	Portable conductivity/salinity meter (YSI Model 30)
Turbidity	Pocket turbidimeter (Hach Cat. No. 52600-00)
Sulfide	Colorimeter (Hach DR 890)
Free and total chlorine	Pocket colorimeter (Hach Cat. No. 46700-00)

Table 3-5

Deviations from the Sampling and Analysis Plan, Island Princess

Deviation	Description
Pathogen Indicators Laboratory Duplicates	For 5% of the pathogen indicators samples, duplicate 100-mL sample volumes were taken with the intention that the laboratory would composite the 100-mL sample volumes and then analyze duplicate samples from each composite sample to evaluate laboratory precision (i.e., laboratory duplicates). However, the laboratory did not prepare composites, but instead analyzed each of the 100-mL sample volumes individually. Accordingly, the results obtained from these analyses are field duplicate samples, not laboratory duplicates, and are presented and handled as such in this report. See Section 5.2.3 and Table 5-4 for details on duplicate sampling for pathogen indicators.
Laundry Wastewater (SP-2), Composite Samples	The strap-on flow meter set-up and calibration was unsuccessful at the laundry wastewater sampling point (the inlet pipe to the laundry wastewater holding tank), most likely due to poor pipe flow conditions such as pipe scaling or extreme aeration. As a result, flow data could not be collected at this sampling point. In addition, the flow meter could not be used to initiate collection of flow-weighted composite samples at SP-2 as described in the Island SAP. As an alternative sampling methodology, the automatic sampling machine was programmed to collect a time-weighted composite sample as described in Table 3-2. EPA conclude that the collected samples were representative of laundry wastewater as generated onboard the Island.
Laundry Wastewater (SP-2), Grab Samples	The sampling team successfully collected only one set of four planned grab and grab composite samples on Day 1 of sampling due to the inability to coordinate sample collection times with adequate wastewater volumes in the laundry holding tank. Sample volume from the single grab was sufficient for analysis of pathogen indicators, volatile organics, and total cyanide, but was not sufficient for analysis of HEM/SGT-HEM and available cyanide.
Effluent from Treatment (SP-6/7), Composite and Grab Samples	Composite by flow sampling at SP-6/7 was suspended on Day 3 from 0720 to 2115 because overboard discharge was restricted while the ship cruise Glacier Bay. (The flow meter that controlled composite by flow sample collection was located on the overboard discharge pipe, but during this time the effluent was diverted to storage in double-bottom holding tanks.) The four grab and grab composite sample collection times were adjusted to account for the suspended discharge as the sample tap was also located downstream of valve that diverts the treated effluent to the double-bottom holding tanks. See Appendices A-1 and A-3 for the grab and grab composite collection times, respectively.
Volatile Organics Preservation	Free chlorine was detected in pre-sampling field tests at all sampling points. Based on these results, the sampling team prepreserved all volatile organics sample vials with sodium thiosulfate rather than waiting to determine preservation requirements based on the free chlorine field test results. Free chlorine was generally detected in grab samples collected throughout the sampling episode. (Sample vials were also prepreserved with hydrochloric acid to control biological activity as discussed in the Island SAP.)

Table 3-5 (Continued)

Deviation	Description
Galley, Laundry, and Food Pulper Overboard Discharge (SP-8, SP-9, SP-10) and Waste Biosludge (SP-12)	During the pre-sampling set-up, the ship notified EPA that galley, laundry, and food pulper wastewater and waste biosludge would be discharged prior to docking in Whittier, Alaska (prior to the start of the sampling episode), and that these holding tanks would not be discharged again until after the 5-day sampling episode had ended. Discharge prior to entering Whittier was necessary since the ship would be greater than 12 nm from shore, and the crew needed wastewater storage capacity prior to embarking new passengers. Therefore, to characterize these four waste streams as discharged, samples were collected on August 26, 2004, approximately 1.5 days prior to the start of the sampling episode. These samples were then shipped to the appropriate laboratories from Whittier on August 28. Because the onboard pathogen indicators laboratory was not yet operating at the time of sample collection, pathogen indicator analyses for these samples were performed approximately 18 hours outside the required 6-hour holding time; the resulting data are not considered valid.
Food Pulper Overboard Discharge (SP-10) and Waste Biosludge (SP-12), Semivolatile Organics Analysis	The analytical laboratory notified EPA that the food pulper overboard discharge samples for semivolatile organics analysis were received broken. Therefore, the sampling team collected a second food pulper overboard discharge sample for semivolatile organics analysis on September 2, 2004 after the 5-day sampling episode had ended. Upon receipt and review of the laboratory data package, EPA discovered that the waste biosludge sample was broken and not the food pulper overboard discharge sample. As a result, the analytical database for the Island includes two sets of semivolatiles data for food pulper overboard discharge and no semivolatile data for waste biosludge. The second set of semivolatiles data for food pulper overboard discharge can be found in Appendix A-2.
Analytical Methods	<p>EPA-contracted laboratories substituted comparable EPA analytical methods for certain analytes. Table 3-3 lists the actual analytical methods used by the laboratories.</p> <p>Note that while the Island SAP correctly listed EPA Methods 624 and 625 as the planned methods for analyzing for volatile and semivolatile organics, respectively, Appendix E of the Island SAP mistakenly listed the target analytes for EPA Methods 1624 and 1625. Appendix A-2 of this report presents the actual list of target volatile and semivolatile organics.</p>
Sampling Schedule	The sampling team adjusted the sampling schedule in Appendix C of the Island SAP to accommodate sampling logistics and ship operations. Refer to Appendix A-3 of this report for actual samples collected and sample collection dates/times.